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ABSTRACT

This issue focuses on commodities trading as an essential economic tool. Activities include critical thinking about marketing decisions and discussion on how futures markets and options are used as important economic tools. Discussion questions and a special student project are included. (EH)

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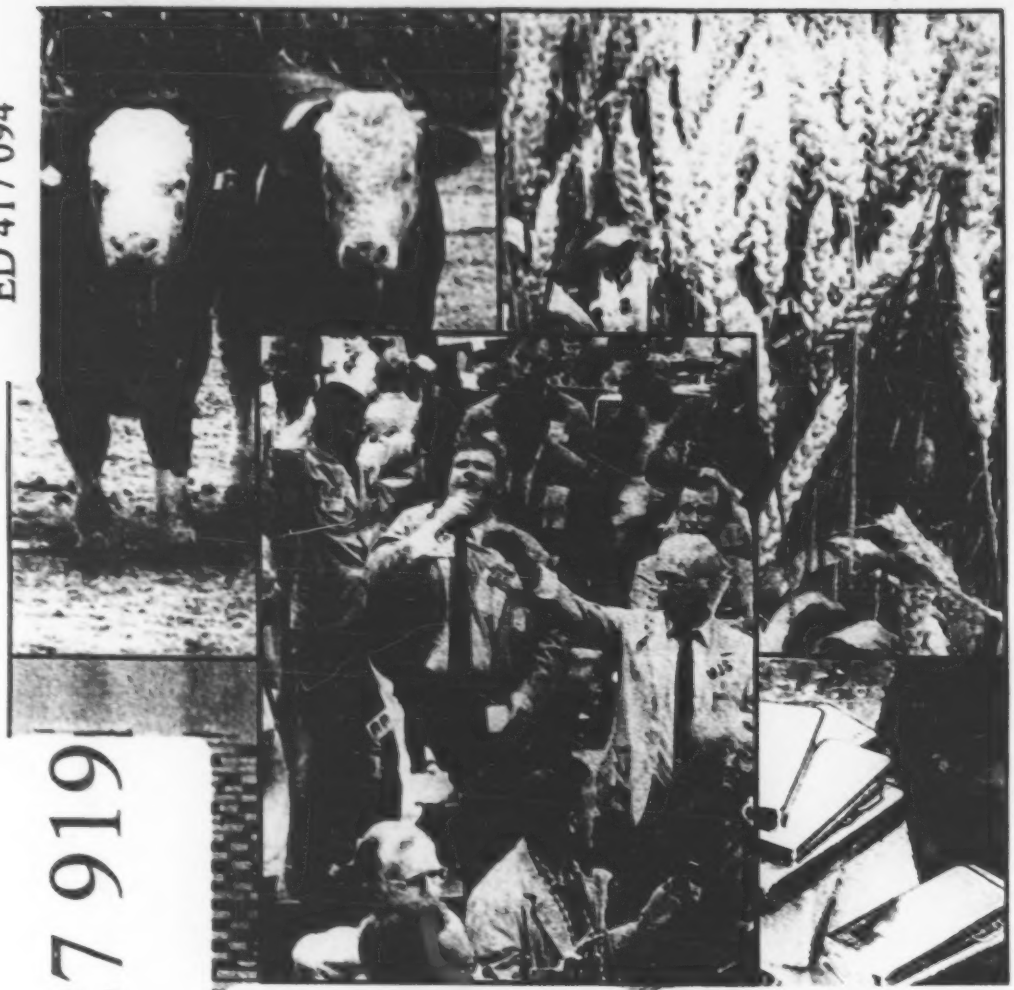
ECONOMIC ISSUES

for Food, Agriculture & Natural Resources

Purdue University School of Agriculture **Fall/Winter 1989-90**



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Mary A. Welch

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This Issue: Commodities Trading — an essential economic tool

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INTRODUCTION

Price — The American economy is often called a consumer-driven society. **Prices** drive this system. Price creation for a good or service in the marketplace illustrates a major difference between a free enterprise and a centrally-planned system.

The price of any commodity (e.g., crude oil, lumber, soybeans, precious metals, wheat, cattle) is determined by many factors affecting supply. Goods manufactured from a commodity are available to consumers based on an established price that the consumer can afford to pay while the producer is hopefully able to cover cost and make a profit. From these raw commodities we get consumer products (i.e., plastic garbage bags, maple stereo cabinets, cooking oil, gold chains, donuts, and hamburgers at the Burger Noodle).

TEACHING OBJECTIVES

1. To explain why and how futures markets began.
2. To explain futures contracts and options and to tell how they are used to benefit buyers and sellers.
3. To illustrate how futures markets and options are used as important economic tools.

ABOUT THE COVER: Center photo depicts action on the trading floor (photo courtesy of the Chicago Board of Trade). Commodities traded on futures markets: top left, steers; top right, wheat; bottom left, lumber; bottom right, precious metals (photo courtesy of Commodity Exchange, Inc. of New York).

Economic Issues is published by the Office of Resident Instruction — Mary A. Welch, Editor.

MARKETING...COTTON FOR SWEATERS, CORN FOR SYRUP, STEERS FOR HAMBURGER—

Marketing is the transfer of goods and services from producers to consumers (sellers to buyers). They communicate through price, and price is determined primarily by supply and demand. As a student of economics, you know that prices are higher when a commodity is scarce and lower when it is plentiful.

A marketplace is where buyers and sellers meet to exchange goods. Supermarkets, shopping malls, furniture stores, and pizza parlors are examples of common marketplaces. In a shopping mall, you may look for a cotton sweater. You find two or three designer styles and one off-brand. Style and workmanship are important buying factors; however, price is also a major consideration. If a sweater you like has a price you are willing to pay, you will probably buy it.

You may think the seller sets the price. For example, a retailer calculates the price of a sweater by adding overhead costs and a profit margin to the price paid to the manufacturer. If this price is acceptable to buyers, the sweater will sell. However, customers may not want to pay this price, or another store may sell similar sweaters for less. If this happens, the sweater may be marked down (goes on sale). Thus, we see that the buyer also helps to create the price. Price provides information and incentives. The seller wants to make money while buyers want to purchase sweaters that look fashionable, are affordable, and washable.

Let's say cotton to make sweaters is grown only in Mississippi. Suppose that because of low prices, the cotton for your sweater never leaves Mississippi. People in Indiana and other states would be upset if cotton sweaters were only available in Mississippi. These customers would be willing to pay more for a sweater in Indianapolis or Chicago. How is the cotton bought and sold? A buyer for a manufacturer of cotton sweaters might use the futures market to buy cotton for future delivery. If the buyer lives in Vermont and cotton is grown in Mississippi, how is the cotton purchased? A call is made to a cotton broker in New York and cotton futures contracts are purchased.

FUTURES CONTRACTS...ANOTHER KIND OF MARKET

History — In the early 1800s, farmers had difficulty transporting cattle or corn to markets. They endured adverse weather conditions and traveled over rutted dirt roads to towns where buyers were interested in their commodities. Price was determined by the number of cattle or bushels of corn farmers could manage to get to a market. Farmers worked even harder to get to cities. One of those cities was Chicago, due to its central location. Farmers brought commodities to Chicago by horse-drawn wagons over plank roads and through rivers on canal boats. After arriving, they still needed to find a buyer and would go from grain dealer to elevator operator to shipping dock trying to find a customer. As transportation methods improved and supplies increased, farmers had more difficulty finding buyers. A farmer who arrived in Chicago with wheat near the end of harvest received a lower price because of the great wheat supply. No storage facilities were available; so,

over the winter months, supplies ran low. By spring, prices were very high. The prices for goods produced from these commodities increased over the winter, too. For example, a loaf of bread costing three cents during harvest might cost as much as twenty cents the following spring. Clearly, there was a great need for a specialized market where buyers and sellers could meet. In 1848, after experiencing much confusion and the lack of any organized means of agreeing on a price, the Chicago Board of Trade was established to create an exchange of commodities. At first, the market traded commodities on the spot. However, both producers and users saw the advantage of being able to make a contract to buy or sell commodities in the future (at a later date).[1]

Futures contract prices are created in a public arena with many buyers and sellers. A contract of corn (5000 bushels) can be sold while the crop is still in the field, i.e., in July. In the contract, the farmer promises to deliver this 5000 bushels of corn for a specific time period like March of the following year. This might be three to four months after it is harvested.

These "futures contracts" help both buyers and sellers plan long term. Sellers know how much they will receive for their crops and buyers know how much corn will be available at a specific price to make corn meal, corn syrup or to sell to bakeries and restaurants. This system still operates today with buyers and sellers acting on behalf of producers (farmers) and users (manufacturers) of commodities. They agree by publicly "crying-out" a price for which they are willing to sell, or a price they are willing to pay. By the early 1900s, many special exchanges were created to handle the various commodities available. Today there are a number of exchanges which trade various commodities:

Chicago Board of Trade:	corn, soybeans, soft red winter wheat, silver, treasury bonds.
Chicago Mercantile Exchange:	live hogs, live cattle, feeder cattle, pork bellies, lumber, treasury bills, Japanese yen, Swiss franc, British pound.
New York Mercantile Exchange:	platinum, palladium, crude oil, heating oil, gasoline, propane.
Commodity Exchange, New York:	copper, gold, silver, aluminum.
Coffee, Sugar and Cocoa Exchange, New York:	cocoa, coffee, sugar.
New York Cotton Exchange:	cotton, orange juice.

Futures traders can be **hedgers** or **speculators.** A hedger can be the farmer or a grain buyer for a cereal company. These individuals see the value of their inventories change as prices change. If prices drop, they may suffer large losses. To reduce this risk, they may decide to use futures markets to hedge. Hedgers do not want to risk financial gain or loss when prices change. Speculators are also futures traders, but their purpose is to make a profit based on anticipated price change.

[1]Based on Chicago Board of Trade materials.

CORRECTION*

CHART I

Cash Market	Futures Market
Oct.- Expect to net $4.00/bu wheat	Oct.- Sell July Futures wheat at $4.00/bu
July- Sell wheat to elevator or processor at $3.00/bu wheat	July- Buy July Futures wheat at $3.00/bu
	Futures Gain $1.00/bu

Cash price when wheat is sold	$3.00/bu*
Gain in futures	1.00/bu

EFFECTIVE SELLING PRICE-$3.00/bu + 1.00/bu=$4.00/bu

Why would someone want to purchase a futures contract or be a hedger?

A hedge means protection against changing prices. As a producer, a hedge in the futures market might involve deciding in May (when you have 150 little pigs) that you will accept a specific price in the future, let's say in August when those same pigs reach market weight (230 pounds). The quoted futures price might be $43.00 per hundredweight. The pork producer protects in May for what could be a lower price in the cash market in August.

LET'S MAKE A MARKETING DECISION—

EXAMPLE I. You are a **wheat producer** (farmer), and you want to be sure you will get a fair price per bushel even with a surplus of wheat on the market at harvest. In October, you want to hedge against a possible decline in price [lock in a July selling price of $4.00 per bushel (bu) for your crop]. Chart I shows the outcome in July if wheat prices decline by $1.00 per bushel.

CHART I

Cash Market	Future Market
Oct.-Expect to net $4.00/bu wheat	Oct.-Sell July Futures wheat at $4.00/bu
July-Sell wheat to elevator or processor at $3.00/bu wheat	July-Buy July Futures wheat at $3.00/bu

	Futures Gain $1.00/bu
Cash price when wheat is sold	$2.00/bu
Gain in futures	1.00/bu

EFFECTIVE SELLING PRICE — $3.00/bu + 1.00/bu = $4.00/bu

What has happened? You gained $1.00 per bushel for the wheat grown and delivered in July because it was "hedged" (sold wheat futures contracts for $4.00 per bushel) in October when the wheat was planted. When the wheat was harvested (the next July), the market price (cash market) was $3.00 per bushel, but you gained $1.00 per bushel by using the futures market. Therefore, your effective selling price is $4.00 per bushel.

Let's see what happens if wheat prices increase by $1.00 per bushel.

CHART II

Cash Market	Futures Market
Oct.-Expect to net $4.00/bu wheat	Oct.-Sell July wheat Futures at $4.00/bu
July-Sell wheat to elevator or processor $4.00 + $1.00/bu = $5.00	July-Buy July wheat at $5.00 ($4.00 + $1.00/bu=$5.00)
	Loss ($1.00/bu)
Cash price when wheat was sold	$5.00/bu
Loss in futures	(1.00/bu)

EFFECTIVE SELLING PRICE — $5.00 -1.00/bu = $4.00/bu

As the **producer** in both of these examples, you establish or guarantee yourself a selling price of $4.00 per bushel for wheat you must deliver in July. You give up the opportunity to benefit from the price increase of $1.00 per bushel in chart II in order to assure yourself protection against a price decrease of $1.00 per bushel illustrated in chart I. This hedge worked perfectly.

EXAMPLE II. On the other hand, if you are a grain buyer for a major cereal company, you may want to protect yourself against rising cash prices if poor weather conditions (e.g.,drought, flood) deplete much of the wheat available on the market in July (low supply, high price). What could you do in the futures market to protect yourself?

Assume that it is November. "Buds" Cereal Company is calculating how much wheat they will need for their products. The futures contract price in November for July delivery of the following year is $4.00. But, the buyer for "Buds" Cereal Company is afraid that the price may go much higher by July because the long-range weather forecast predicts continued low rainfall in the wheat-producing states of Nebraska, the Dakotas, and Kansas. To protect (hedge) against this price increase, the buyer purchases July wheat futures. Chart III shows what happens if the price increases by 50 cents per bushel.

CHART III

Cash Market	Futures Market
Nov.-Expect to buy wheat from producer at $4.00/bu	Nov.-Buy July wheat Futures at $4.00/bu
July-Buy wheat from producer at $4.00 + $.50/bu	July-Sell July wheat Futures at $4.50 ($4.00 + $.50)
	Futures Gain $.50/bu
Cash price when wheat is bought	$4.50/bu
Minus gain in futures market	-.50
EFFECTIVE PURCHASE PRICE	$4.00/bu

The grain buyer benefits from locking in the price and saving $.50 per bushel because protection was provided in November by buying a contract for $4.00 per bushel. However, if the cash price had declined, the buyer would not benefit from the lower price. A hedger can gain or lose a lot depending on the volume of commodity being bought or sold. Let's say the estimated need for "Buds" Cereal Company is one million bushels. If the grain buyer saves or loses $.50 per bushel, this is $500,000—a substantial amount for any manufacturing company.

A New Twist to Futures Markets — THE OPTION

Too bad we cannot predict future events like:
— what numbers will win the Indiana lottery.
— how much rain will fall in Kansas next spring.
— who will get sick next year.
— who will break a leg playing soccer.
— whose house will be hit by a tornado.
— whose two-inch corn will get ruined by a hailstorm.
— who will demolish their new car in an accident.

We cannot predict the future, but how do we protect ourselves against the financial losses we might suffer from illness, accidents, floods, loss of life, a stolen car, or a tornado destroying our homes? Insurance, right!?

How do insurance companies make money? They know that some people will stay well and some will get sick next year. Furthermore, they know consumers are willing to pay an insurance premium for a policy that covers hospital and doctor bills if an illness occurs. If the policy holder does not become ill, does the insurance company keep the premium? Of course. They make money from customers who stay well. They have "hedged" themselves and developed sophisticated statistical studies (called actuarial studies) to determine how many people in certain categories are most likely to get sick. From these numbers, they determine the cost of premiums to cover costs of those who do get sick. However, they charge sufficiently high

premiums to realize a profit. As the insured person, we do not get our premium back if we stay well. But we paid for the peace of mind that medical bills would have been paid.

A similar alternative is available for commodities to insure against the financial loss of an unfavorable price change. It is called **the options market.** There are individuals willing to take a premium and give the buyer price protection if futures prices move unfavorably but not obligate the buyer if futures prices move favorably. You might say, "The buyer can't lose!" However, a price, or premium, is paid to have that "**option.**"

An option on futures is a **choice.** The buyer of an option acquires the right, but not the obligation, to buy or sell the underlying commodity futures contract under specific conditions in exchange for the payment of a premium.

How are these options traded? Options are traded the same way futures contracts are traded, through open outcry of competitive bids and offers.

Let's see how the purchase of an option affects the wheat farmer's price illustrated in chart I. Rather than sell futures at $4.00, let's say the wheat producer purchased an option contract to sell futures at $4.00 and paid a $.10 per bushel option premium. When the futures price drops to $3.00, the producer exercises the right to sell futures at $4.00. How much does the producer net for this wheat? The answer is $3.90 per bushel. The producer received $3.00 from the processor or elevator, made $1.00 on the option (sold at $4.00/bu, bought back at $3.00/bu), and paid $.10/bu for the option premium. If the same option is purchased in the chart II example, the producer is not obligated to sell at the $4.00 futures price but simply takes the more favorable cash market price of $5.00/bu. In this case, the producer nets $4.90 for the wheat ($5.00 cash price minus $.10 option premium = $4.90).

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THIS IS THE SYSTEM—

COMMODITIES MARKETS USA—

WHAT ARE THE STRATEGIES???

Background — Option markets were used in conjunction with futures markets in the 1930s. However, insufficient regulations caused the U.S. Congress to ban the use of options and make them illegal at that time. Early in the 1980s, U.S. marketers felt that options had a place in the free enterprise system. In 1982, Congress re-authorized options trading, but it was not until 1984 that options were again traded after a moratorium of almost 50 years.

Futures markets and options are interesting to study and provide challenging and interesting careers. Chris Wuethrich, a 1989 B.S. graduate of the Department of Agricultural Economics in Purdue University's School of Agriculture, studied futures and options for his senior honors project. He developed a computer program simulating 48 marketing strategies based on a model farm in Northern Indiana marketing 500 acres of soybeans per year from 1975 to 1988. The strategies varied to give a wide perspective of what would have happened if the producer had made different marketing decisions over these years.

The following simulated marketing strategies were considered in Chris' study.

1) **Control** — various methods of pricing the soybeans in the cash market were examined.

STRATEGY EXAMPLE	EXPLANATION
Cash Sale at harvest	Farmer sells all of the soybeans at the cash price on a designated date which represents a typical mid-harvest time. The date used was October 15.
Cash contract	Farmer sells on a forward contract in the cash market equal parts of the total bushels expected to be produced. Each part is sold on the 15th of each month from May through October.

2) **Timing** — either selling futures or buying options on specific dates throughout the growing seasons.

STRATEGY EXAMPLE	EXPLANATION
On May 15 sell futures	Farmer locks in the price offered on May 15.
On May 15 buy options	Farmer takes an option (pays premium) to guarantee a minimum price, but may get a higher price if prices increase.

3) **Cost of production** — pricing the farmer's crop when either futures or options provide a return above the cost of production.

STRATEGY EXAMPLE	EXPLANATION
Price is $.50 higher than cost of production	Farmer receives $.50 more per bushel for the soybean crop after calculating all costs (seed, fertilizer, chemicals, equipment, land, and labor)

4) **Technical analysis** — selling futures contracts or buying options based on already established trading systems using price signals. Analysts study charts that show prices (open, high, low, and closing) each day that futures trading takes place. When these charts are studied, signals appear.

STRATEGY EXAMPLE	EXPLANATION
Prices increase on futures market seven days in a row. On the eighth day prices go down.	This is an example of a signal that could be used to determine the time to sell a futures contract.

Even though options trading is relatively new, Chris did extensive reading to understand the various strategies. By applying some of these strategies, he was really testing their ability to increase the farmer's price over the historical period.

CONCLUSIONS:

Chris' conclusions support the theory that options are an important marketing tool for producers of commodities.

In general, Chris determined that buying options can enhance price received. There was also strong evidence that options can reduce negative price risk, while leaving the positive price moves in place. This really summarizes our definition of **options.** An option allows the buyer to take advantage of rising price but, with price protection if prices fall. His work suggests that the option premium the farmer pays gives a positive return over time.

This is valuable information for producers who need lower risk pricing alternatives. Producers cannot afford more risk than they already have. They take risks each year a crop is planted because they have no control over world-wide weather conditions or over many factors which affect world prices.

HOW HAS THIS INFORMATION BEEN USED?

The CFTC (Commodity Futures Trading Commission) in Washington, D.C. is the regulatory agency of commodity markets. Information from Chris' study was recently cited at a meeting of the agricultural advisory committee of the CFTC in a statement supporting options as an important risk-management tool for producers. Hopefully, this national policy effort will result in making options easier to use.

CHRIS WUETHRICH TODAY—

Chris Wuethrich is currently employed by Demeter, Inc.,[1] a grain buying firm with locations in Indiana, Illinois, and Wisconsin. As a grain merchandiser, Chris buys grain from farmers and is responsible for discussing Demeter's services which include using futures and options contracts. It is important for him to be knowledgeable of all market information available to Demeter so he can determine the best price to offer their customers. Chris hedges grain purchased from farmers by working through brokers who enter his orders in the trading pits of the Chicago Board of Trade.

Chris says of his job, "It is exciting because it is always changing, and it is rewarding to use my Purdue training to help producers make good marketing decisions."

Chris Hurt is a professor in Purdue's Department of Agricultural Economics. As director of Chris Wuethrich's study, Professor Hurt has studied commodity prices, options and futures markets and their effect on the economic health of Indiana agriculture. Professor Hurt's technical advice in developing this issue is acknowledged and greatly appreciated.

[1]Purdue University's School of Agriculture acknowledges and thanks Demeter, Inc. for its cooperation. Reference to Demeter, Inc. does not imply endorsement of its services by the University.

QUESTIONS AND GENERAL INFORMATION TO CONSIDER—

The following test will help you determine how well you have mastered some of these basic concepts. If you have more than three errors, you should study this information further.

Match the following words or phrases with the appropriate definition by writing the letter of the word or phrase that matches each definition. Not all terms are used.

A. commodity	H. marketplace
B. seller	I. futures contract
C. producer	J. price
D. option on futures	K. cwt.
E. hedge	L. buyer
F. cash price	M. effective selling price
G. speculator	N. profit

_____ 1. Which term best describes a shopping mall?

_____ 2. A buyer and seller agree to purchase and sell an amount of a certain commodity on a future date at a set price.

_____ 3. Use of futures markets to protect a future buying or selling price.

_____ 4. Pay a premium and acquire a choice to buy or sell a commodity at the futures contract price or reserve the right to buy or sell at the cash market price if it's more favorable.

_____ 5-6. Prices are determined by both the _____ and _____ .

_____ 7. Mr. Smith buys a futures contract hoping the cash price will be higher. If this is the case, he will sell the contract and make a profit. Mr. Smith is considered a _____ .

_____ 8. The money left after all expenses are paid.

MULTIPLE CHOICE—Circle the letter of the best answer to each of the following.

9. Futures hedging is used by a soybean producer to
   A. assure a specific future price for his soybeans.
   B. assure a specific cash market price for his soybeans.
   C. Improve his soybean yield.
   D. Protect his soybeans from insect infestation.

10. Which one of the following is not considered a commodity?
   A. wheat.
   B. silver.
   C. soybeans.
   D. automobiles.

11. In the early 1820s, bread in a general store was probably
   A. higher in July than in March.
   B. lower in July than in March.
   C. about the same in October as in March.
   D. always the same in October as in March.

12. How would a drought in most of South America during the soybean growing season affect the price of U.S. soybeans on the world market if good growing conditions prevailed in the United States?
    A. Prices would not be affected.
    B. Prices would be higher.
    C. Prices would be lower.
    D. Prices would fluctuate, depending on weather conditions in the USSR.

SPECIAL STUDIES PROJECT—

Hedging — Select a business in your location that might benefit from hedging in the futures market. Ideas: furniture manufacturer, food processor, grain-elevator, meat packer, bank. Research the business to determine whether or not they should consider hedging. Trade associations and publications related to the business you select, as well as magazines and business sections of newspapers, will help you find this information. What raw materials are needed to produce their products? Interview the manager, owner, accounting or purchasing manager to find out how they acquire raw materials to produce the end product. How often are raw materials purchased? Is there any seasonal buying? Does the business have storage facilities? Do they use forward contracting for future delivery? Could the raw materials be hedged? Does the business have a hedging program? If it does, find out what raw materials are hedged. If it does not, find out why the company does not hedge. Reading the local business section of your newspaper should also provide information on the organization.

II. Using the *Wall Street Journal* available in your library, plot the daily cotton prices for one week. Assume you are a buyer for a linen manufacturer, and you have $200,000 in a budget to purchase cotton for a new line of 100% cotton sheets. You must have the cotton to begin production in six weeks. Looking at the trend, decide what you think prices will do in the next few weeks. Compete with others in your class to buy as much cotton as you can with the $200,000. Are prices high, low, or fairly stable? What has an increased demand done to the price of cotton? What is the size of this year's crop?

Answers 1-12

1. H	4. D	7. G	10. D
2. I	5. B	8. N	11. B
3. E	6. L	9. A	12. B

Reminders from Office of Resident Instruction:

Reprints of *ECONOMIC ISSUES for Food, Agriculture & Natural Resources* are available from Mary A. Welch.

Reprints of *Research the Future in Agriculture* are available from Rebecca J. Goetz.

PROJECT FUTURE — April 7, 1990

Plans are underway for another action-packed day featuring research and careers in the food, agricultural and natural resource system. Watch for registration materials in February.

PROFESSORS IN THE CLASSROOM

Professors from the School of Agriculture will come to your high school classes free of charge to discuss economic issues with your students. Contact Rebecca J. Goetz for details.

Scholarship Award of Excellence applications are available through your high school guidance office. These $1000 scholarships are available to incoming freshmen in the School of Agriculture. Contact Carla N. Yerkes for details.

Resident Instruction Office staff will arrange personal visits for students interested in the School of Agriculture. Call for details.

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